WHAT IS CLAIMED IS:

1. A method for ascertaining process variables with a microscope system, the method comprises the following steps:
   a) combining into one intensity vector ($\vec{\mathbf{I}}$) the intensities ascertained by a plurality of detectors from different spectral regions of a measurement operation;
   b) calculating a norm of the intensity vector ($\vec{\mathbf{I}}$);
   c) discarding those intensity vectors whose norm is less than a definable threshold value (*SW*), so that said vectors are left out of consideration in the remainder of the method;
   d) normalizing the intensity vectors ($\vec{\mathbf{I}}$);
   e) delivering the intensity vectors to a vector quantizer and processing the intensity vectors ($\vec{\mathbf{I}}$) using the vector quantizer; and
   f) reading code book vectors out of the vector quantizer.

2. The method as defined in Claim 1, wherein calculation of the norm is based on the Euclidean distance to a coordinate origin.

3. The method as defined in Claim 1, wherein the vector quantizer is embodied as a "learning vector quantizer" or as a competitively learning neural network, or can be derived or inferred therefrom in the context of a mathematical approximation.

4. The method as defined in Claim 1, characterized by the following steps:
   - selecting a subset from the plurality of code book vectors; and
   - conveying the selected code book vectors to an analysis and visualization unit.

5. The method as defined in Claim 4, wherein selection of the subset of code book vectors is limited to those code book vectors that are nearest to the axes of a coordinate system, each coordinate axis representing detection in one detection channel.

6. The method as defined in Claim 4, wherein the code book vectors have a slope with respect to the coordinate axes and to each other and the slope is employed to ascertain the crosstalk of the individual detection channels.

7. The method as defined in Claim 6, wherein on the basis of the ascertained crosstalk an automatic adjustment of a multi-band detector is performed in order to minimize the crosstalk of the individual detection channels.

8. The method as defined in Claim 4, wherein the axes of the coordinate are visually depicted in double or triple fashion, and the code book vectors located nearest to said axes are plotted.

9. The method as defined in Claim 4, wherein the axes of the coordinate system are visually depicted in pairs, and the code book vectors located nearest to said axes are plotted.

10. The method as defined in Claim 4, wherein a counter that serves to visualize the significance of the signal component represented by the particular code book vector is allocated to each visual depiction of the axes of the coordinate system.

11. The method as defined in Claim 1, comprising the following steps:
   - acquiring the local coordinates in a specimen during the scanning operation, and the intensities (I_1, I_2, ... I_n) associated with the local coordinates;

- comparing the intensity vectors ($\vec{\mathbf{I}}$) to the code book vectors; and
- classifying the intensity vectors ($\vec{\mathbf{I}}$) onto the nearest code book vector.

12. The method as defined in Claim 1, wherein the following steps are performed before steps a) through f):
    - time-offset, block-based intermediate storage of the intensity vectors; and
    - formation of vectors from the particular current intensity vector and from the time-offset intensity vector acquired before the particular current and intermediately stored intensity vector, the two vectors deriving from the same location in the specimen.

13. The method as defined in Claim 12, wherein the slopes of the code book vectors are analyzed in order to ascertain and visualize the bleaching behavior or influences of active setting parameters.

14. The method as defined in Claim 1, wherein the following steps are performed:
    - calculating a correction matrix from the code book vectors; and
    - applying the correction matrix to the currently measured intensity vectors with simultaneous image construction.

15. An arrangement for ascertaining process variables in a microscope system, comprises:
    a) means for combining into one intensity vector ($\vec{\mathbf{I}}$) the intensities (I_1, I_2, ... I_n) ascertained by a plurality of detectors from different spectral regions of a measurement operation;
    b) means for calculating a norm of the intensity vector ($\vec{\mathbf{I}}$);
    c) means for discarding those intensity vectors whose norm is less than a definable threshold value (SW);

d) means for normalizing the intensity vectors;

e) a vector quantizer that processes the intensity vectors; and

f) means for reading code book vectors out of the vector quantizer.

16. The arrangement as defined in Claim 15, wherein the normalizing means perform the calculation of the Euclidean distance to a coordinate origin.

17. The arrangement as defined in Claim 15, wherein the vector quantizer is embodied as a "learning vector quantizer" or as a competitively learning neural network, or can be derived or inferred therefrom in the context of a mathematical approximation.

18. The arrangement as defined in Claim 15, wherein
- means for selecting a subset from the plurality of code book vectors; and
- means for conveying the selected code book vectors to an analysis and visualization unit

are provided.

19. The arrangement as defined in Claim 18, wherein a multi-band detector is provided that performs an automatic adjustment on the basis of the ascertained crosstalk in order to minimize the crosstalk of the individual detection channels, a selection of the subset of the code book vectors being limited to those code book vectors located nearest to the axes of a coordinate system, each coordinate axis representing detection in one detection channel; and the slope of the code book vectors with respect to the coordinate axes and to one another can be employed to ascertain the crosstalk of the individual detection channels.

20. The arrangement as defined in Claim 18, wherein a visual depiction means is provided; and the axes of the coordinates can be depicted in double or triple fashion, and the code book vectors located nearest to said axes can be plotted.

21. The arrangement as defined in Claim 18, wherein a visual depiction means is provided; and the axes of the coordinate system can be visually depicted in pairs, and the code book vectors located nearest to said axes can be plotted.

22. The arrangement as defined in Claim 18, wherein a counter that verifies the significance of the signal component represented by the particular code book vector is allocated to each visual depiction of the axes of the coordinate system.

23. The arrangement as defined in Claim 15, wherein
    - means for acquiring the local coordinates of a specimen during the scanning operation, and the intensities associated with the local coordinates;
    - means for comparing the intensity vectors to the code book vectors; and
    - means for classifying the intensity vectors onto the nearest code book vector

    are provided.

24. The arrangement as defined in Claim 15, wherein
    - means for time-offset, block-based intermediate storage of the intensity vectors; and
    - means for forming vectors from the particular current intensity vector and from the time-offset intensity vector acquired before the particular

current and intermediately stored intensity vector, the two vectors deriving from the same location in the specimen,

are provided.

25. The arrangement as defined in Claim 24, wherein means are provided for analyzing the slopes of the code book vectors, in order to ascertain and display on the visual depiction means the bleaching behavior or influences of active setting parameters.

26. The arrangement as defined in Claim 15, wherein
   - means for calculating a correction matrix from the code book vectors; and
   - means for applying the correction matrix to the currently measured intensity vectors with simultaneous image construction

   are provided.

27. An system for ascertaining process variables in a microscope system comprises a scanning microscope that guides a light beam in parallel or sequential fashion over a specimen; multiple detectors that ascertain, from the light emerging from the specimen, intensities from different spectral regions; a processing unit; a computer; and input unit; and a display, wherein
   a) in the processing unit, means for combining into one intensity vector the intensities (I_1, I_2, ... I_n) ascertained by detectors (19) from different spectral regions of a measurement operation;
   b) means for calculating a norm of the intensity vector;
   c) means for discarding those intensity vectors whose norm is less than a definable threshold value (SW);
   d) means for normalizing the intensity vectors;
   e) a vector quantizer that processes the intensity vectors; and
   f) means for reading code book vectors out of the vector quantizer

are provided.

28. The system as defined in Claim 27, wherein the normalizing means perform the calculation of the Euclidean distance to a coordinate origin.

29. The system as defined in Claim 27, wherein the vector quantizer is embodied as a "learning vector quantizer" or as a competitively learning neural network, or can be derived or inferred therefrom in the context of mathematical approximation.

30. The system as defined in Claim 27, wherein
    - means for selecting a subset from the plurality of code book vectors; and
    - means for conveying the selected code book vectors to an analysis and visualization unit

    are provided.

31. The system as defined in Claim 30, wherein the visualization unit is a display on which, in at least one window, the code book vectors can be depicted visually in a coordinate system.

32. The system as defined in Claim 30, wherein a multi-band detector is provided that performs an automatic adjustment on the basis of the ascertained crosstalk in order to minimize the crosstalk of the individual detection channels, a selection of the subset of the code book vectors being limited to those code book vectors located nearest to the axes of a coordinate system, each coordinate axis representing detection in one detection channel; and the slope of the code book vectors with respect to the coordinate axes and to each other can be employed to ascertain the crosstalk of the individual detection channels.

33. The system as defined in Claim 30, wherein the axes of the coordinates can be depicted in triple fashion, and the code book vectors located nearest to said axes can be plotted, on the display.

34. The system as defined in Claim 30, wherein the axes of the coordinate system can be visually depicted in pairs, and the code book vectors located nearest to said axes can be plotted, on the display.

35. The system as defined in Claim 30, wherein a counter that verifies the significance of the signal component represented by the particular code book vector is allocated to each visual depiction of the axes of the coordinate system on the display.

36. The system as defined in Claim 27, wherein
    - means for acquiring the local coordinates of a specimen during the scanning operation, and the intensities associated with the local coordinates;
    - means for comparing the intensity vectors to the code book vectors; and
    - means for classifying the intensity vectors onto the nearest code book vector

    are provided.

37. The system as defined in Claim 27, wherein
    - means for time-offset, block-based intermediate storage of the intensity vectors; and
    - means for forming vectors from the particular current intensity vector and from the time-offset intensity vector acquired before the particular

current and intermediately stored intensity vector, the two vectors deriving from the same location in the specimen,

are provided.

38. The system as defined in Claim 37, wherein means are provided for analyzing the slope of the code book vectors, in order to ascertain and display on the display the bleaching behavior or influences of active setting parameters.

39. The system as defined in Claim 27, wherein means for calculating a correction matrix from the code book vectors, and means for applying the correction matrix to the currently measured intensity vectors with simultaneous image construction, are provided.